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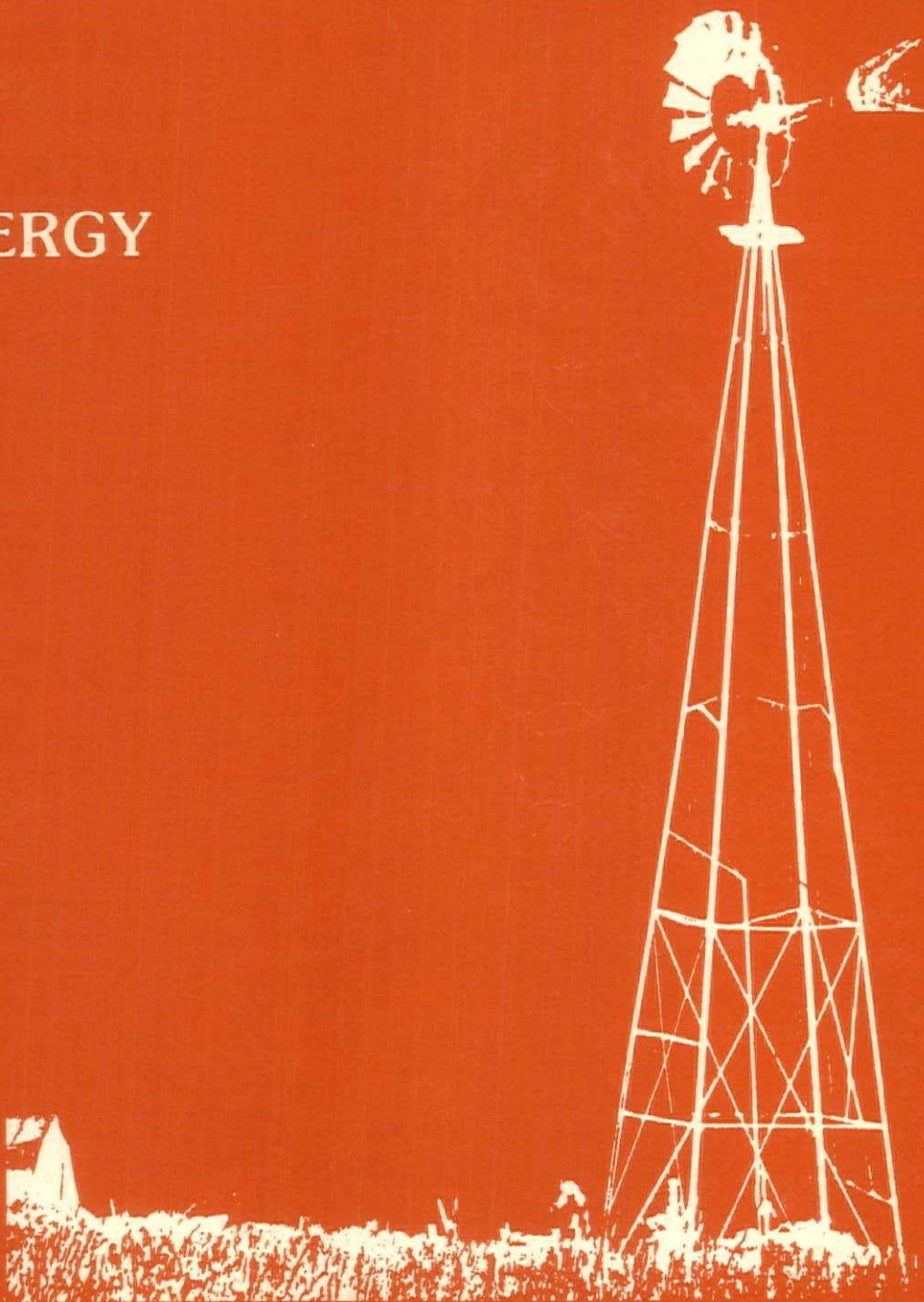
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ENERGY



A Publication of the Wisconsin Society of Architects, American Institute of Architects



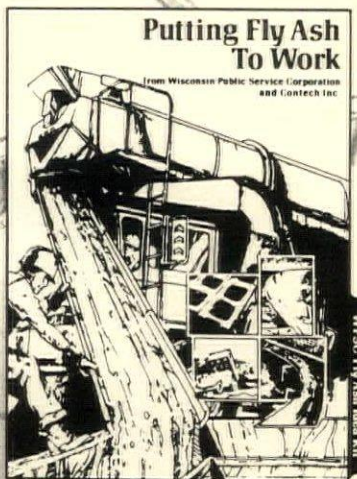
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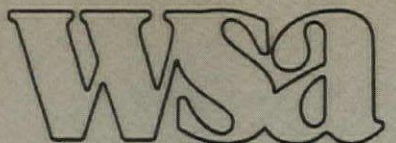


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The Wisconsin Architect is the official publication of the Wisconsin Society of Architects/A.I.A., published by Wisconsin Architect, Inc. Address all editorial and advertising inquiries to: Editor, Wisconsin Architect, 615 East Washington Ave., Madison, WI 53703; Phone: 608/257-8477. The Wisconsin Architect and WSA disclaims liability for statements by the editors, contributors, and advertisers.

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On The Cover . . .

Photographer

Steven C. Ramey

INTRODUCING THE AUGUST ENERGY ISSUE

By Ken VanDehy, AIA

This is the energy panel's first effort at preparing an entire issue of a magazine.

Ruth Swaizik volunteered her time to organize energy experts, write articles, obtain, mail, and deliver articles to various parties for all purposes including editing, review, and coordination.

Lillian Leenhouts, FAIA, has once again provided consistent concern and timely contacts to get my attention back on the energy track when I get too involved with other matters of lesser importance.

We also express our appreciation to the authors of the 28 articles considered for publication this month, and only wish the typesetters could squeeze everything into the magazine and keep it legible.

In closing, I would like to once again extend a warm invitation to anyone interested in expanding the manpower of the Energy Panel by joining us on a permanent basis.

AIA has projected a 30 percent average reduction in energy consumption in existing buildings and a 60 percent figure for new construction. With your help and participation these figures will be shown to be conservative.

WHY WEREN'T YOU THERE ? HERE'S YOUR SECOND CHANCE

By Kenneth VanDehy, AIA
WSA Energy Coordinator

SETTING THE SCENE MAY 17, 1981

In a modest conference room in the second basement level of the new Marquette Hotel, IDS Center in Minneapolis, Minnesota, at the National AIA Convention, a National AIA Open Energy Committee Meeting happened.

This meeting was properly prepared for by those people who planned the convention. It was given reasonable black ink and equal space in the schedule with other events. It was given adequate space for the 16 funded members and the 50 interested people in the audience. It occupied an "out of the way" location that was workable. Dedicated energy professionals are not looking for lots of amenities. They want action and production fast.

Lillian Leenhouts and I looked through this crowd all day. As the Energy Panel Coordinators for the WSA/AIA, we were expecting to see other Wisconsin Architects. During the introductions we discovered the audience was representative of occupations and business locations nation-wide. Only half were architects. **Where were you on this Saturday?**

OVERVIEW 1981

Energy was described as the leading program in the AIA, by John Anderson, FAIA. 1981 is the second of five years of the Five Year Energy Action Plan.

Quite frankly, the AIA is putting all of its financial eggs in one basket. Funding is all going into energy education. It's called Energy Professional Development Program (EPDP).

The theory is that the single most urgent task of the AIA Energy Forces is to upgrade all architects to a higher level in current energy technology and practice. The magnitude of this commitment is more than significant. In 1980 the budget was \$6,000. In 1981 the budget was \$500,000. Once completed it should give AIA members a decided advantage.

EPDP

At the open meeting in Minneapolis architect Carl Stein discussed the EPDP and delivery to the professionals:

A. A single copy of the educational (EPDP) text exists, warmly referred to by 1981 Energy Steering Committee members as the "silver bullet." It is controversial in content because it seems that no one can accurately define the exact current level of energy expertise of all architects. Therefore, it is too tough for some critics, and too simple for others. The text is also controversial because it was required to be written to "stand alone" although it could also be used as a portion of a high cost series of seminars which would produce further income to fund the other five goals of the five-year plan. Controversy was based primarily on the philosophical question — do we place economic stability more highly than we place the urgency to get the new energy information implemented? High priced seminars will not contact nearly as many people as early as mailings at cost to all AIA members. This issue is still unresolved. You could have major impact by writing and calling the Steering Committee Members.

B. Delivery to the architects is based primarily on existing materials. However, the committee finds it necessary to search for or create some omitted material. The information is product oriented for practical real world application. The text should provide tools for the architects.

wisconsin architect/august, 1981

The AIA Open Energy Committee Meeting ended for lack of time. There is still considerable work to be done for which YOU and I can get considerable satisfaction, national recognition, personal improvement, etc. If you really care about the energy crisis — shut off the !#?# T.V. and start producing. The world needs you. The energy experts are just human beings like you and I. They can't do it alone — but they won't quit. Let's lighten their load a little, or at least expand their effectiveness. We might save our economy at the same time.

C. The number of participants is immense. Eight thousand architects must be reached in two years. A test program will occur in Texas in September. A modified program occurred at the AIA Convention. A conference will occur on Saturday, October 31, 1981. In Denver, November 1, 2, & 3, 1981, energy exhibits will be displayed by the Design Committee. Discussion was made of a modified EPDP text of the educational text and program in Denver.

D. "EPDP" program content would include the Energy Action Overview Matrix, (upgraded matrix), audiovisual show, level II workshops, level III workshops, a "Design Energy" monthly publication with updates on technology, financing and legislation, an Energy Handbook referred to as the energy graphic standards, instructors to be selected and trained. There is also a vague notion of a catalogue to integrate non-AIA material. The concept was not pinned down to a definable task.

A basic concern vital to the effectiveness of the entire AIA energy program is the level of education needed. **YOU ARE QUALIFIED** to tell the Steering Committee members what level of energy education program YOU NEED. Speak up loudly. They need input from real people — especially you.

Another worthy spin-off from attending the convention was the chance to meet members of the Chicago/AIA Energy Panel, and the Minnesota Energy Panel.

Minnesota makes us look like unconcerned amateurs. But they are willing to assist us through the early steps of forming an Energy Panel. We have the advantage of having an aggressive legislature in the State of Wisconsin when it comes to energy issues. We are ahead of Chicago because the WSA/AIA has allocated \$500.00 to energy issues. I could use recommendations for the most effective use of that money and new budget priorities for next year. I could use a right hand person to do nothing but contact other state AIA energy organizations to find out what they have done effectively that we might reuse. Even the national AIA energy forces would love to get hold of that information. Join the energy panel. Write a letter to me indicating how many hours per year you can dedicate. We can upgrade each other.



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CONSERVATION VS CONDENSATION

F.C. Schulz, P.E.

"Conservation of energy", without question, has finally reached a level of prominence where every man, woman and child in this Country is, at least, familiar with its intent and meaning. They may not be actively participating, and they may not be fully convinced that our energy supplies are, indeed, dwindling, but the massive PR program conducted by all segments of the news media, government agencies, technical societies, utilities, etc., etc. has implanted the idea in everyone's sub-conscious that he "should" conserve.

Complacency is a common characteristic in a Nation where the standard of living is limited only by one's individual effort, where the luxuries associated with improved life styles are readily available to those who are willing to earn them, and where advanced and sophisticated technology has always resolved a national problem, in record time.

The current energy status is highly conducive to complacency, considering the news media's emphasis on excessive world oil production, a "glut" of oil and gas domestically, a lowering of gasoline prices, OPEC's stabilization of oil prices, readily available gas from local utilities, cutbacks in electric utility expansion, etc.

$$U = .07 = 6.0 \text{ Btu / Ft}^2$$

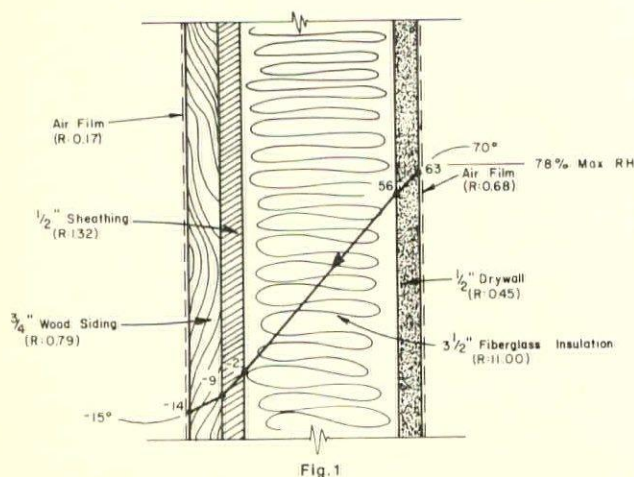


Fig. 1

$$T_x = T_i - \frac{(R_1 (T_i - T_o))}{R_2} \quad (1)$$

where: T_x = Surface temp., F° at specific point in construction
 T_i = Indoor room temp., F°
 T_o = Outdoor design temp. for locality, F°
 R_1 = Total of "R" (resistance) values of construction components from the room side to the point of measurement within the construction
 R_2 = Overall "R" value of total construction

In totaling the "R" values for any construction it is important to remember to include the value for the microscopic insulating film of air which exists immediately adjacent to any vertical or horizontal exposed surface, whether outdoor, indoor, in a wall cavity or in a ceiling plenum.

The recommended "R" values for these films are as follows:

Horiz. Surf. in still air	0.61 "R"
45 Deg. Surf. in still air	0.62 "R"
Vert. Surf. in still air	0.68 "R"
Any Surf. 15 mph wind	0.17 "R"
Any Surf. 7.5 mph wind	0.25 "R"

The "R" values themselves are readily available from the manufacturer of the specific materials, or as published in the 1977 ASHRAE Handbook on Fundamentals and dozens of other technical manuals. For maximum accuracy in computations, it is recommended that the specific manufacturer be consulted since the present emphasis on improved insulating values is causing rapid changes in manufacturing technology and production methods.

On the basis of Formula (1), a temperature gradient thru the

construction can be prepared as shown by the heavy line in Figures 1 through 4 of typical wall sections, based on climatic conditions of -15° outdoor (t_o) and 70° indoor (t_i). Fig. 22 on single and double glazing has been included primarily to graphically show the insulating value of a dead air space.

The "U" value, or Btu heat transmission thru the entire wall section, is shown at the top of each Figure. Fundamentally, the "U" factor is the reciprocal of the total "R" value, and represents the Btu's lost per square foot, per degree difference between the indoor and outdoor temperature. As an example the total "R" value of Fig. 1 is 14.41. The reciprocal is:

$$\frac{1}{14.41} = 0.0694 \text{ (or } 0.07) = \text{"U" Factor}$$

$$0.07 \times (70^\circ - (-15^\circ)) = 5.95 \text{ (say } 6) \text{ Btus/sq. ft.}$$

Figure 1 also shows a temperature of -9° behind the siding, -2° behind the sheathing, 56° behind the insulation and 63° at the room surface, when the outdoor temperature is -15° .

The second point of this discussion involves "Dewpoint" which, simply stated for our purposes, is the surface temperature at which visible condensation will occur under set conditions of surrounding air tem-

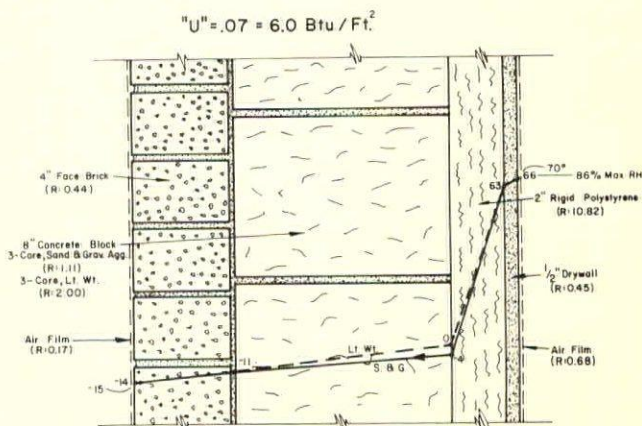


Fig. 2

So, "who do you know wants to conserve?" The awakening, and it will be a rude one, will occur when the Nation's economy returns to normal, when production and GNP regain their former levels, and unemployment returns to the 3-4% level. Couple this with severe Winters such as we had several years ago and the "glut" will miraculously disappear, like a mirage!

As to our technology providing an immediate answer, or an immediate alternate resource, there will be no economically feasible solution for at least 15 years, and then only after vast sums of money are expended.

Our only immediate "alternate resource" is conservation. It is available right now. It can produce immediate savings. It is one of the only ways of cutting overhead, short of reducing your staff and your production.

It is cheapest to implement, right now. Above all, it buys an extremely precious commodity, TIME! Our technology desperately needs time to resolve the most critical problem in our history, whether you believe it or not!

The main thrust of this article, however, deals with a problem which has been created in many buildings **because of** energy conservation practices, and which, in the long run, can offset any savings realized over the first several years. The problem is "**negative pressure**" within the building and its effect

$$U = .08 = 6.8 \text{ Btu/Ft}^2$$

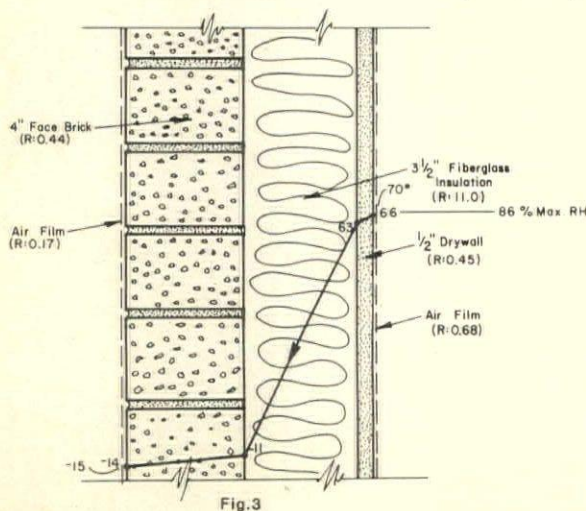


Fig. 3

on condensation within the architectural and structural components. Unless this development is fully understood by the design professions, especially Architects, there will be many an anxious moment as Owners prepare their accusations for faulty design or faulty construction materials and installation.

To fully understand the mechanics of this problem, there must be a fundamental knowledge of (1) surface temperatures, (2) dewpoint, and its relationship to surface temperatures, room temperatures and room humidity, and (3) the basic cause of negative pressure within a building structure.

First, the surface temperature at any point within a composite wall or roof can be easily calculated by use of the following formula:

perature and relative humidity, or the point at which the water vapor in the atmosphere begins to condense. Once the dewpoint temperature has been reached, further cooling will result in more condensation of water vapor on the cool surface, gathering in drops, and literally "raining" from the surface.

The determination of dewpoint temperatures is generally made from a "psychrometric chart", a portion of which is shown in Fig. 23 only to present a simplistic explanation of how a given set of temperature and humidity conditions react when cooled. (A simplified table of dewpoint temperatures is shown in Figure 23A).

In our example as shown, the room conditions are being maintained at 75°F and 35% relative humidity. The air closest to the cold exterior wall, ceiling or roof begins to cool along the horizontal line shown between point A and point B.

Note that as the temperature is dropping, the humidity is rising! At 70°, the humidity is 41%. At 65° it is 49%. At 55°, it is 70%. At 46°, it is 100%!

In other words, at 46° the air is saturated and can hold no more moisture. Therefore, the original combination of 75° and 35% relative humidity has a **dewpoint** of 46°.

If the surface in contact with this air is anywhere between 33° and 45°, moisture will form on the surface. If the surface temperature is 32° or less, frost and ice will form on the surface.

As the surface temperatures within the structure vary due to (1) outdoor and indoor temperature changes and (2) exposure to sunlight, the alternate wetting and drying of the construction materials causes a constant expansion and contraction which ultimately results in rotting, spawling, corrosion and general deterioration of the entire wall, roof or window frame. Unfortunately this condition may be occurring without any visible indication from within the room itself, since the inside surface is dry and apparently very normal. The condensation, however, may be occurring **internally**!

$$S. \& G. - U = .09 = 7.7 \text{ Btu/Ft}^2$$

$$L.W. - U = .08 = 6.8 \text{ Btu/Ft}^2$$

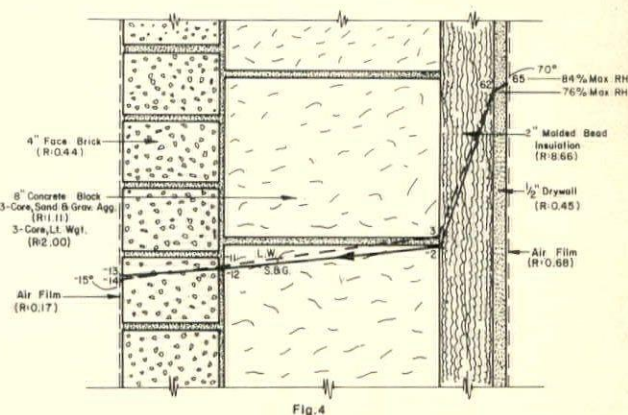


Fig. 4

In order to maintain a perfectly neutral, or no-pressure, condition within a building, the CFM (cubic feet per minute) of air exhausted through the exhaust fans must be exactly replaced with the same CFM of outside air brought in through the air handling units or supply fans. If more outside air is brought in than is exhausted, the building is under a **positive** pressure. If more air is exhausted than is brought in, the building is under a **negative** pressure. Input must equal output, or outside air CFM must equal exhaust CFM, to maintain a neutral building pressure.

Exhaust air quantities in public buildings are dictated by Codes and Standards, hence represent a fixed and constant volume during normal hours of occupancy. The mechanical designer, therefore, designs his central supply air systems to bring in the same volume of outside air, as a minimum, in order to maintain system balance and prevent the building from going into a severe negative pressure condition.

Enter "Energy Conservation"!

We all know that bringing in outside air during the Winter will have horrendous effects on the monthly Utility bill, right? Therefore, the quickest way to achieve a reduction in energy costs is to manually close the outside air intake dampers at the air handling units, right?

The net results can be tabulated as follows:

- There **definitely** is a reduction in energy costs;
- Since the exhaust fans are still sucking air out of the building, and no replacement, or outside, air is being brought in, the building is under a high **negative** pressure;
- Infiltration is greatly accelerated through windows and window frames, entrance doors and **construction materials**;
- The internal space humidity levels **increase** due to the lack of outside air being introduced at the air handling units;
- The surface temperatures within the construction materials are much colder than normal due to the **infiltration** of cold outside air;
- Moisture and/or frost begins forming **within** the construction materials, much sooner and heavier than if the building was under a positive pressure;
- Life expectancy of the building materials is drastically reduced, requiring replace-much sooner than anticipated and offsetting all energy savings realized;

As an added energy conservation measure, the maintenance man recaulks all windows, replaces all window and door weatherstripping and generally seals all cracks and crevices he can find, thereby further sealing the building and further increasing the negative pressure in the building with its damaging and costly effects.

An additional costly effect is the downdraft in chimneys and domestic hot water heater vents, since they represent the only openings to the outside. This back-pressure has a severe effect on burner efficiencies and could, alone, offset the energy savings achieved by closing the outside air dampers.

In summary, buildings must be ventilated properly in order to maintain minimum condensation levels. Buildings must be allowed to "breathe". Question the building's mechanical system operation whenever accusations are leveled at the Architect for faulty design or specification of materials.

The over-zealous and unqualified custodian may be responsible for unwittingly creating a serious problem, all in the name of "conservation."

DEW POINT TEMPERATURES
RELATIVE HUMIDITY

Room Temp.	10%	20%	30%	40%	50%	60%	70%
70	15°	28°	37°	44°	51°	56°	60°
71	15°	28°	38°	45°	52°	57°	61°
72	16°	29°	38°	46°	52°	58°	62°
73	17°	30°	40°	47°	53°	58°	63°
74	17°	30°	41°	48°	55°	59°	64°
75	18°	31°	42°	49°	55°	60°	64°
76	18°	32°	43°	50°	56°	61°	65°
77	19°	33°	43°	51°	57°	62°	66°
78	19°	34°	44°	52°	58°	63°	67°
79	20°	35°	45°	53°	59°	64°	68°
80	20°	35°	46°	54°	59°	65°	69°

Fig. 23A

INFILTRATION - In Cubic Feet per Hour per Square Foot of Wall

WIND VELOCITY IN MPH	5	10	15	20	25	30	40
Construction							
8 1/2" - Brick wall - plain	1.75	4.20	7.85	12.2	18.6	22.9	34.8
8 1/2" - Brick wall - 2 coats prepared gypsum plaster on brick	0.017	0.037	0.066	0.107	0.161	0.236	0.435
Same, plaster painted, 1 coat sealer, 2 coats paint	0.003	0.009	0.015	0.022	0.029	0.040	0.062
13" - Brick wall - plain	1.44	3.92	7.48	11.6	16.3	21.2	31.80
13" - Brick wall - furring, lath, 2 coats prepared gypsum plaster	0.031	0.100	0.210	0.359	0.530	0.715	
Same - plaster painted, 1 coat sealer, 2 coats paint	0.008	0.018	0.031	0.047	0.066	0.087	0.133
13" - Brick wall - 2 coats prepared gypsum plaster on brick	0.005	0.013	0.025	0.043	0.067	0.097	
Same - plaster painted, 1 coat sealer, 2 coats paint	0.003	0.009	0.015	0.022	0.029	0.040	

Formula: Btu/Sq. Ft./Hr. = CFH x .018 x (F°inside - F°outside)

Fig. 24

How does moisture, or humidity, penetrate a solid masonry wall, or any type of construction? "By vapor pressure". The moisture content of the air within the building creates its own pressure, totally independent of any air movement or air currents within the space. This literally forces the moisture into the construction materials, all of which are porous to a greater or lesser degree except for metals and glass.

The answer to this moisture penetration, of course, is a "vapor barrier", installed as close as possible to the interior surface where the penetration originates. Ideally, the barrier should be the interior surface material or finish.

Unfortunately, whether the barrier is of a structural type, a membrane or a coating, the effectiveness is totally dependent on the integrity of the workmanship. A pinhole leak in a membrane or hair-line cracks in a coating can literally destroy the effectiveness of the entire barrier.

Consider the multitude of wall and barrier penetrations by way of electrical junction boxes, telephone outlets, nail holes for picture hanging, drapery supports, etc., etc. Improper sealing of the wall at the floor level can also provide a major passage for moisture into the wall interior.

The last item of discussion is the effect of building static pressures (or internal air pressure) on all of the data presented thus far.

An important fact to remember is that virtually all types of wall construction permit leakage of air, or "infiltration", **directly through the construction materials!** The results of ASHRAE tests, conducted more than 60 years ago, confirmed the rates of infiltration through solid masonry and these results are shown in Fig. 24.

The question which urgently begs an answer is "How does this air movement through the wall effect our calculations for surface temperatures within the construction, as shown in

Mr. Schulz is Manager of Enervations, a division of Ring and Du Chateau, Contracting Engineers.

Figures 1-4?" Unfortunately, no conclusive tests have been performed, to the best of my knowledge.

Logically, it stands to reason that the internal temperatures must drop, since Formula No. 1 is based on **no air movement** through the structure. As a consequence, if internal temperatures are lowered, the chances for internal condensation are vastly increased.

The logical answer to this problem is to maintain a slightly positive pressure within the building, thereby causing the warmer room air to "exfiltrate" through the construction, rather than have a negative building pressure which "infiltrates" cold outside air.

Although wind velocities can have a major effect on infiltration on the windward side of a building, and exfiltration on the downwind side, the prime contributor to positive or negative building pressure is the mechanical system controlling the building environment.

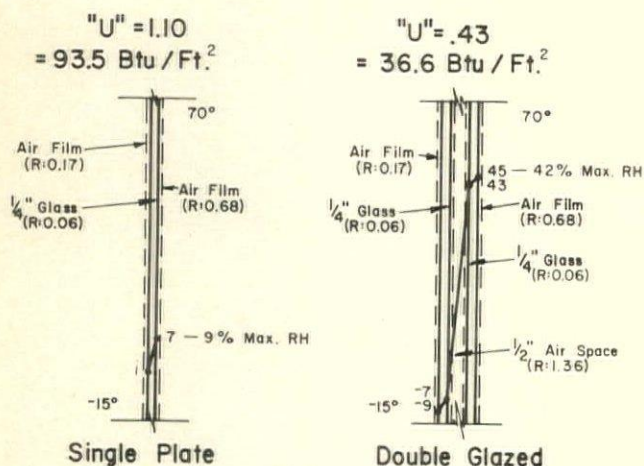


Fig.22

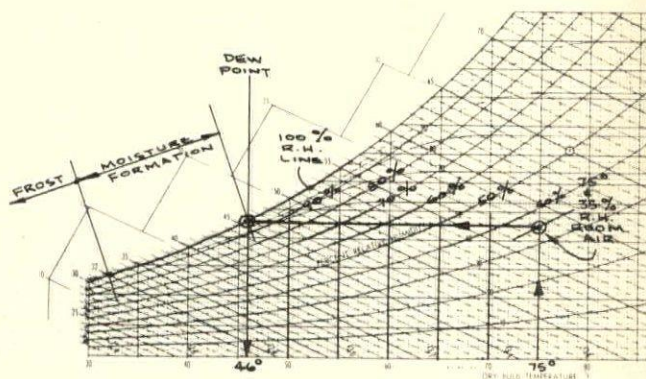
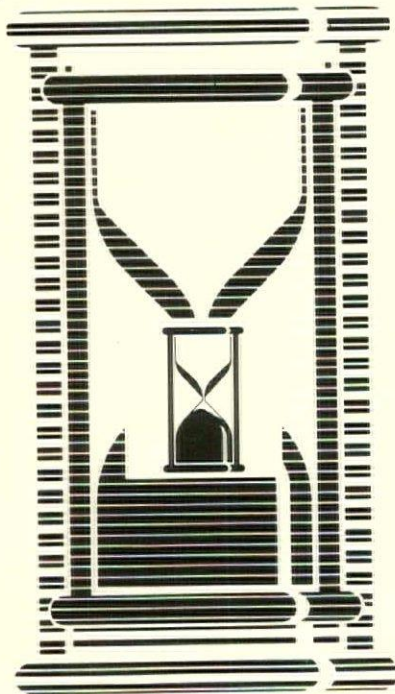


Fig.23

Some folks talk as if we have a choice about nuclear power generation.



We don't.

"No nukes!" is a clear and simple slogan.

However, it has a clear and simple corollary which is never added in the same breath: no nukes, less economic growth.

Some clear and simple statistics explain why this is so.

In 1979, according to the Edison Electric Institute, 32.2% of our thermally generated electric power came from oil and natural gas. The rest, 67.8%, came from coal and nuclear power. (Hydroelectric power supplies a mere 1.2% of America's electricity.)

Now, to help make possible our necessary economic growth we will have to double our electric generating capacity in the next 15 years. What fuels can we use? Time is running out.

By 1990, natural gas will have been eliminated, by government mandate, as a source of electric power. Oil will be prohibitively expensive for such purposes. And solar energy is not expected to come into its own until we are well into the 21st century.

Coal production and distribution can't go forward fast enough to meet our needs. And the costs of coal-powered generation are substantially more than those of nuclear power.

Despite reported threats posed by a few malfunctions the fact is that there have been no deaths or severe injuries to the public as a result of radiation from commercial nuclear power generation. It is one of the safest activities on earth.

So if you're thinking of expanding your business or increasing production, think electrically and talk to a qualified electrical contractor.

But also think realistically about where your electricity must come from.

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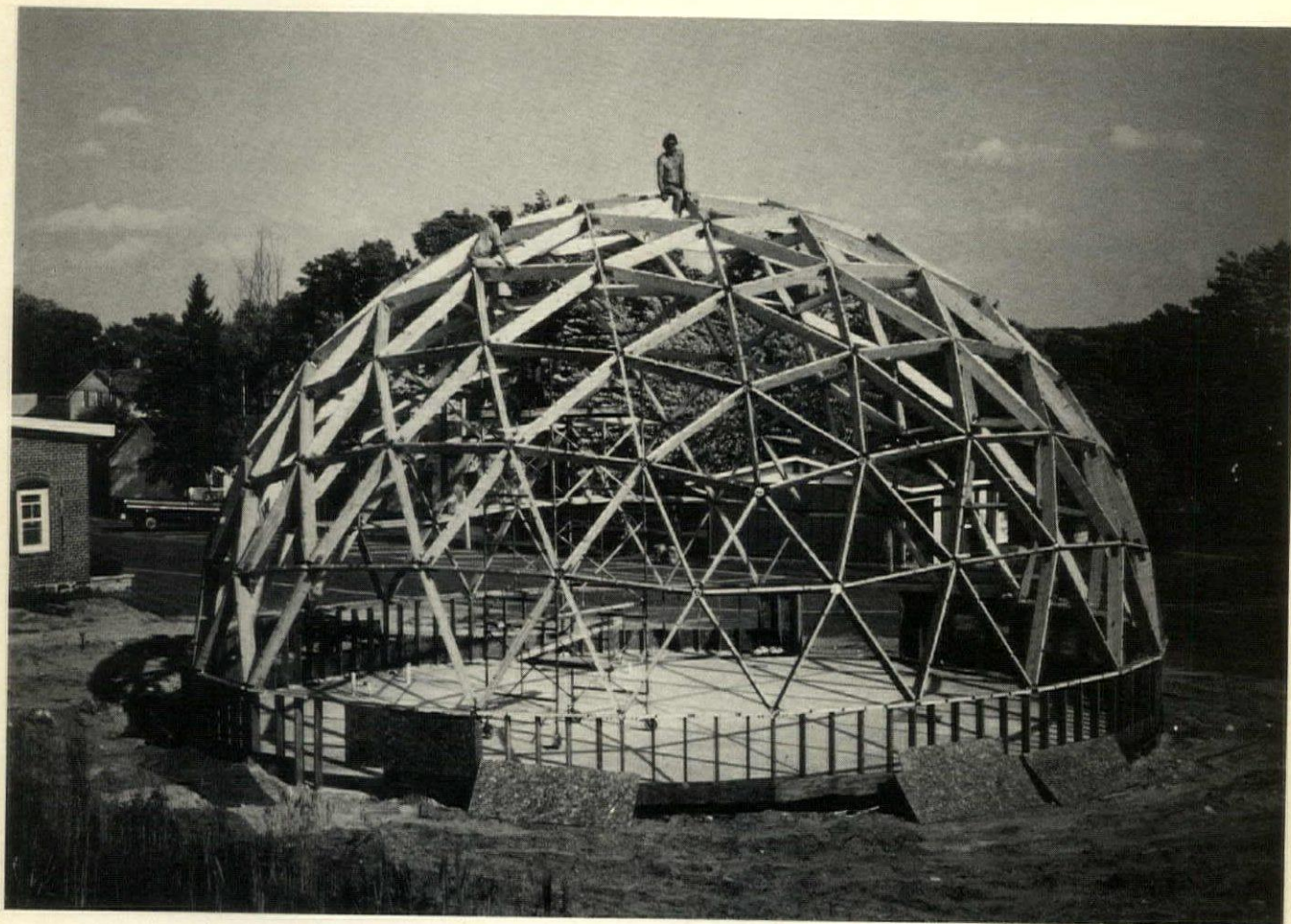
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Small Commercial Buildings Can Be Built This Way Too!



In the Governor's Home Energy Contest held for the State of Wisconsin a forty foot, two story dome home in Cedarburg, Wisconsin with a full basement has won first place in its class. The home energy consumption was totaled for the twelve month period from May 1, 1980 thru April 31, 1981. Total square footage in the dwelling is 2,989 square feet. The dome shell is 8½ inches thick with a 7½ inch insulated cavity. The house is all electric. Total energy use (cooking, bathing, heating, etc.) is as follows.

The dome home required 29,792 BTU's per square foot for one entire year. Many items were taken into consideration when the dome home was built, such as insulating windows, doors, caulking and weatherstripping, and wrapping hot air and water

runs with insulation. Low voltage circulating fans keep air circulation constant in order to avoid stratification of heated air.

To determine air quality, the Environmental Protection Agency ran an air quality test on the dwelling in the month of February, 1981. The dwelling was tested for above average concentrations of carbon monoxide, for-

maldehyde, and particulate matter. All tests showed interior air to be no different than the air outside of the building.

Many of the same building principles with the addition of passive solar, have been incorporated in a 52 foot diameter dome built for commercial purposes in the city of Montello, Wisconsin. It is now the assembly hall for the Montello senior citizens.



Important Information for Architects on GAS SERVICE

The Public Service Commission of Wisconsin has approved Wisconsin Gas Company's request to offer natural gas service to commercial and industrial firms.

This authorization allows the acceptance of liberally expanded service to new customers and additional amounts of natural gas to existing customers.

If your clients are planning a new building or plant, desire to convert their present facility, or are expanding . . . contact your Wisconsin Gas commercial or industrial representative for specific information to assist you in meeting their needs for natural gas service.



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Masonry's Importance In Passive Solar

By Lillian Leenhouts, FAIA

The Masonry Institute of Wisconsin and the Concrete Masonry Industries, in cooperation with M.S.O.E.; the National Concrete Masonry Association; and the Brick Institute of America, Region 5, put together two very attractive seminars — one last December and one last March. At both events, 500 people attended and at each event, hundreds had to be turned away, so popular was the subject matter.

Here are a few of the notes I took. They are very useful points, some of which have newly become more apparent. Perhaps they will be exciting discoveries of some readers.

A. On underground construction, from Brent Anderson of the University of Minnesota:

- Soil is a moderator, not an insulator.
- Try for walls of R 20-30; roof R50.
- One pane of glass, R 1; two panes, R 3; three panes, R 3; four panes, R 4.
- Asphalt emulsifies under water. Use Butyl rubber or Ben-tonite clay.
- Use 1" minimum insulation on block outside to stop inside condensation.
- Figure 40# to 60# lateral pressure underground and use 3" to 4" of insulation on the block.

B. Dale G. Kolbeck of Anders, Inc., the consistent winner in the annual Parade of Homes of the Metropolitan Builders Association of Greater Milwaukee, showed a house built with his partner Andy Lewis:

- 93% of the glass was to the south.
- There is much interior brick and masonry for "mass storage" of passive solar heat.
- 3' and 4' earth berm cuts infiltration and cools in summer.

- Open plan. Storage areas to north and rooms to south.
- Used some "Arctic Seal": 3 layers of milar: R6.3.
- Brick exterior — heat lag.
- Back-up heat — fireplace and furnace.
- Annual heat — \$134 per year.
- R 16 walls, R 40 ceiling.

C. Anders Lewis of Anders, Inc.:

With the interior brick wall raised to 74° by the sun and the air, at 64° it feels like 70° in the room.

4" of masonry provides the optimum thickness per dollar cost.

With 18 to 35 sq. ft. of floor area in glass, one can collect or save 14% to 18% of heat load. Adding night insulation of R 9 raises this to 48% up to 70%.

D. Stephen G. Heibein, Energy Engineer of the National Concrete Assn., engineer for the Anders house:

The Anders house incorporated twice the masonry mass storage as Heibein suggested.

E. Dr. J. Douglas Balcomb of the Los Alamos Scientific Laboratory:

Masonry is good anywhere in the room — it need not be in the sun's path.

The ceiling tiles developed for heat storage in Massachusetts proved expensive so are being dropped.

Daylight is important.

The Los Alamos Scientific Lab has a good handbook of figures if one wishes to request it from the Lab's Energy Division.

Don't vent a Trombe wall unless there is much mass storage.

F. Rodney Wright, architect for Soldiers Grove, the little Wisconsin town that moved to high ground:

The business district of the town will now be out of the Mississippi flood plain.

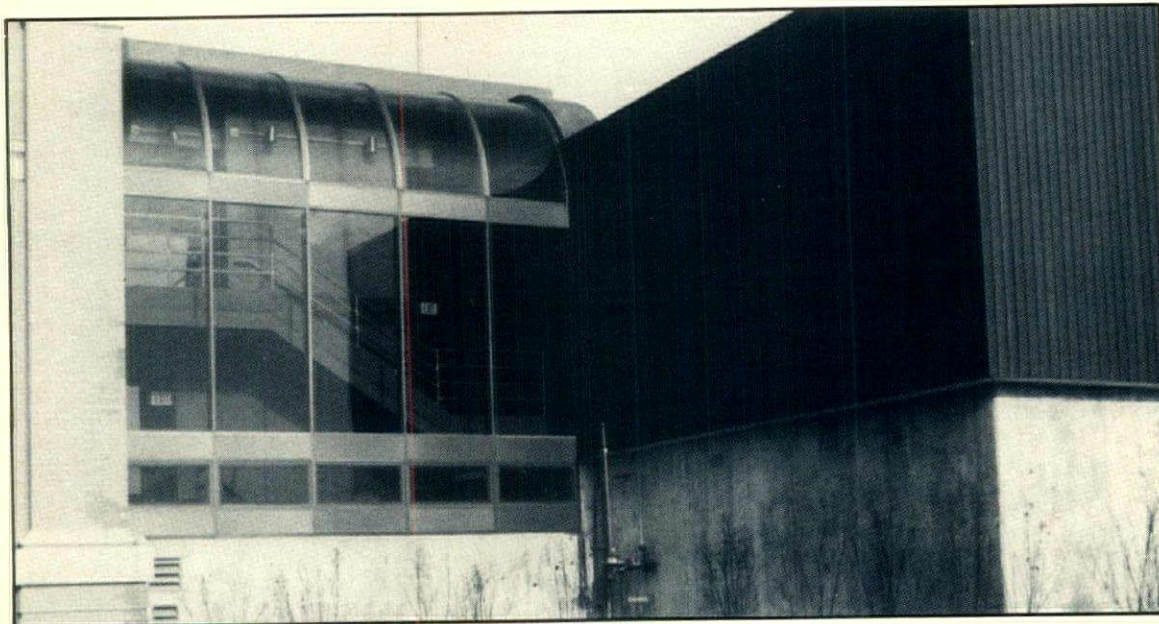
It is possible to build a 100% passively heated solar building.

Solar greenhouses have to have less temperature swings than solar SPACES.

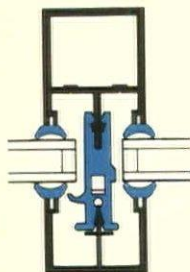
In a solar supermarket, the cans of beans, etc., make for a wonderful heat sink — but you're in trouble if the market switches to selling breakfast food, only.

A naturally vented solar space will generally not get up to 90° F.

Go Straight To Cronstroms When Your Designs Call For Curves



Lake Superior Maritime Museum, Architect: Architectural Resources, Inc., Hibbing, MN; Army Corps of Engineers



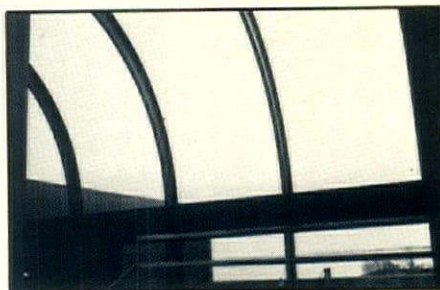
Even though energy efficiency is the watchword in public buildings today, that doesn't mean you have to shackle yourself to time worn designs. Instead, consider the benefits of Cronstroms CTS thermal barrier system. Its energy-saving design eliminates metal-to-metal contact in curved or straight designs. And that means no frost or condensation, even at temperatures of -30°F . Of course, that's something you'd expect

from Cronstroms. Cronstroms was the **first** to develop this thermal break system 14 years ago.

You'd also expect to find unusual applications of the CTS system. You will.

At the Lake Superior Maritime Museum located on Minnesota's waterfront in Duluth, a location buffeted by winter's bone-chilling gale force winds, the architect specified Cronstroms CTS thermal barrier energy saving walls and windows for a new addition linking two sections. Notice the bent mullions of the upper section.

You'll find another distinctive CTS design at First Federal Savings and Loan where curved mullions frame the glass entry doors.

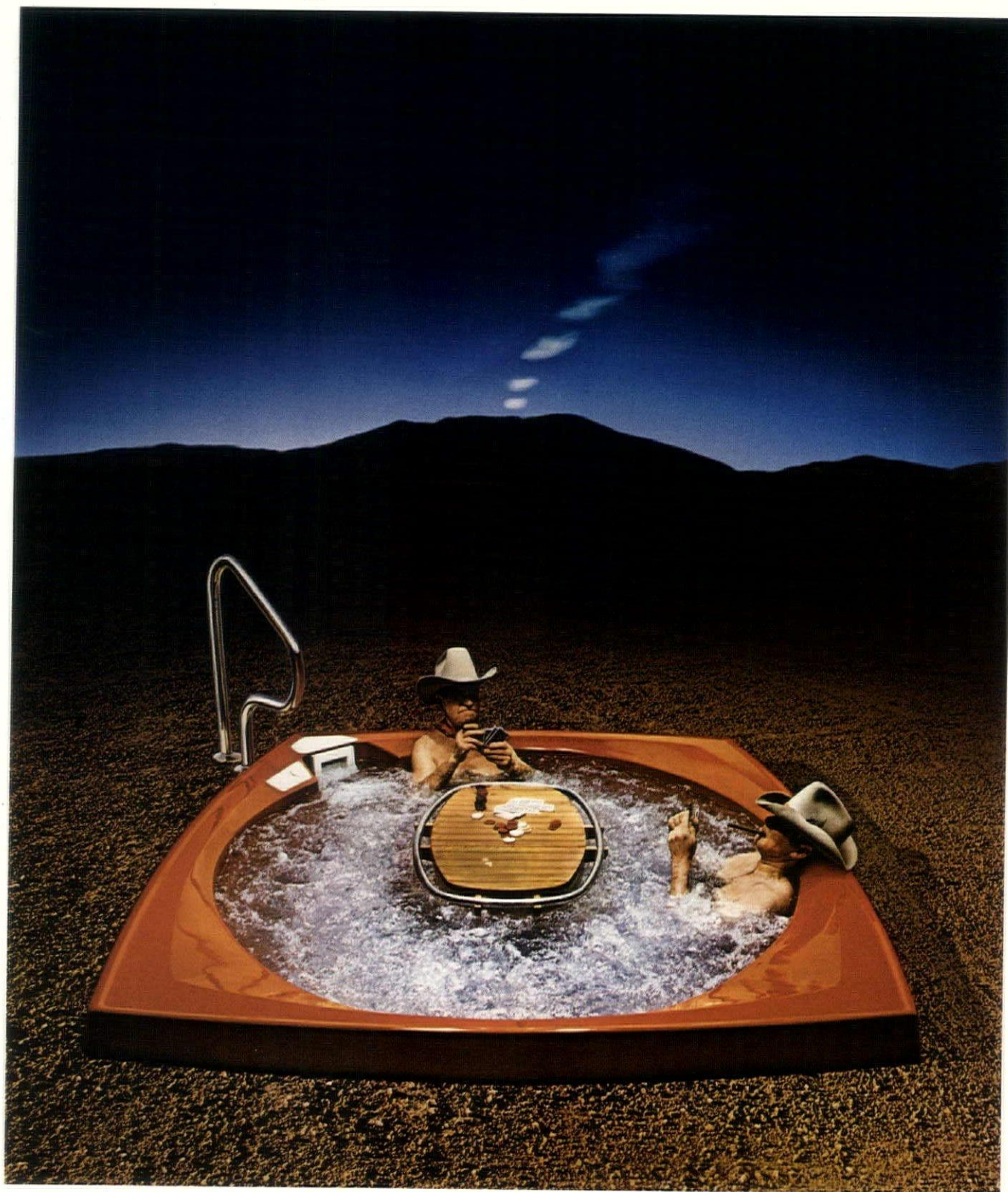


First Federal Savings and Loan, Architect: Gene Hickey & Associates, Minneapolis, MN

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Energy Credit

by Ron Fleissner

Energy credits afford the owners of business or agricultural buildings a chance to reduce their tax liabilities by using new business equipment whose primary source of energy is other than gas or oil. There are tax credits available for the installation of or conversion to solar, wind or geo-thermal systems; hydroelectric generating systems; and some other qualified energy property. In the future, the credits on these three categories will range from 15% on the first to 11% on the second and 10% on the last. In most cases, the equipment will have to be placed in service before the end of 1985. There are nine types of equipment that qualify for the energy credit. They are:

- 1) alternative energy property;
- 2) specially defined energy property;
- 3) solar, wind, or solar process heat energy property;
- 4) recycling equipment;
- 5) shale oil equipment
- 6) equipment for producing natural gas from geopressed brine;
- 7) qualified hydroelectric generating property;
- 8) cogeneration equipment; and
- 9) qualified intercity buses.

Obviously, you would not be interested in all nine, but a few of them should tempt you.

Alternative energy property includes boilers, burners, and pollution control equipment which use a substance other than oil or gas as their fuel.

Specially defined energy property consists of new, depreciable equipment with a useful life of at least three years that is added to an existing building to conserve energy by recovering and further utilizing heat or unburned gases. Here you are looking at recuperators, heat wheels, regenerators, heat exchangers, and automatic energy control systems among others.

Mr. Fleissner is a Public Affairs Officer with the IRS in Milwaukee.

Equipment which uses solar or wind energy to generate electricity; to heat, cool or provide hot water in a building; or to provide solar process heat to a building is eligible for the credit. Generally, a solar energy equipment system involves the transformation of sunlight into heat or electricity through the use of such devices as solar cells or other collectors, storage systems for electricity and for hot air or hot water, heat exchangers to utilize captured and stored energy, and related equipment such as fans and thermostats. Similarly, the credit for wind equipment applies to the windmill or other devices to harness outdoor moving air.

Let's suppose that you include the installation of an automatic energy control system in a building that is being renovated. The owner will be able to claim an energy credit of 10% of the cost on his business tax return. That can amount to an attractive consideration when coupled with the resulting fuel cost savings.

If you are interested in learning more about the business energy credits, the Internal Revenue Service's Publication 572, "Investment Credit", discusses the energy credit, which business taxpayers claim on IRS Form 5468. This publication and information about qualifying property may be obtained by contacting local IRS offices. The regulations which describe qualifying energy property do not list every kind of energy property which may qualify for the credit; however, they do provide additional information in regard to specific items.

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Bakke Chiropractic Clinic, DeForest, WI

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Wisconsin Solar News

Vol. IV No. 3

May-June 1981



Government suppresses study:

Sawhill Report explodes energy myths

There is a one-thousand page government study that the government now wants to suppress. What could this study possibly say? It says that America has a golden opportunity to grow, the diminish unemployment, reduce inflation and stabilize its national security (a) without large increases in the use of electricity and coal, and (b) without foreign oil. It also makes not a single mention of nuclear power. The key to the future lies in two things: efficiency and renewable energy resources.

The official title of the study is Report on Building a Sustainable Future, but it is known in energy circles as "the Sawhill Report" after deputy secretary of energy John C. Sawhill, who commissioned it during the Carter administration. The

Reagan's election. No sooner was the Sawhill report done than it was disowned by the new leadership in the Department of Energy. "Conservation is left-wing" a Reagan energy adviser told Daniel Yergin of Harvard. The DOE no longer likes to use the terms "fact" and "analysis". "Production" is the magic word in those halls of policy now.

What are the facts and analysis in the Sawhill report that the current federal administration does not wish to be widely known?

A different kind of growth

To quote the report itself:

Some people want solar because it is good business.
Some want it because it is elegant design.
Some want it because it is ecologically sound.
Some want it because it is an avenue of liberation.

SERA is for all those in Wisconsin who want solar, for whatever reason.

SERA is:

the Wisconsin Chapter of the American Section of the International Solar Energy Society, WISCONSUN CENTRAL, the Wisconsin Solar News, the legislative sub-committee, the speakers bureau, the SERA news service.

Help Make Solar Happen In Wisconsin.

This is the number you call in Wisconsin when you want information about solar energy—any form of solar: direct gain, wind, biomass.

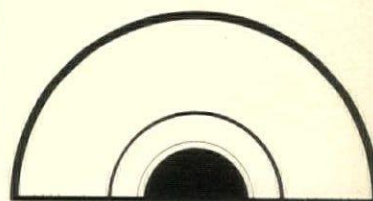
This service is provided by:

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SERA is a membership organization to promote solar in Wisconsin. We want all solar advocates to join—businesses, professionals, consumers—because solar needs educational, political, organizational pushing in addition to standard market forces.

Give us a call, join, get active.



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Energy Conservation In The 80's

*By David Evan Glasser, AIA
Director/Energy in Buildings
Research Institute
UWM School of Architecture
and Urban Planning*

One of the more remarkable aspects of our society is its ability to assimilate and accommodate substantial change without producing intolerable stress. This is nowhere more evident than in the national response to the perceived continuing energy crisis. Americans have, over the past few years, with relatively minimal federal encouragement, managed to not only cut gross energy demand but to initiate mechanisms needed for conservation in all sectors of the economy.

The Construction Industry represents one of the principal end users of energy both with respect to procedures and materials and occupancy utilization. Estimates vary with experts; however, savings of from 30% to 50% of annual building energy budgets have been projected, based on a range of passive concepts.

Without reliance on sophisticated alternative energy generation, it appears that substantial thermal conservation benefits may be derived from a number of relatively straightforward measures which building design professionals can employ. In this regard it must be said that we have reached the point in our national maturity that concern for energy conservation can no longer be considered as an optional area of interest for architectural practitioners. The reality is that in a few years only those architects with demonstrated attitudes and expertise in energy conservation techniques will be getting important commissions. Moreover, in a period of rapid and often pointless change in architectural

styles, an energy related design approach can provide professionals with a non-arbitrary and powerful formal design tool.

All of which is to say that the responsibilities and corresponding opportunities in the 80's require a major individual commitment to energy conservation on the part of all practitioners and architects-in-training. Acquisition of the necessary knowledge base with respect to practical application is readily available. Wisconsin is particularly fortunate in this regard. One of the most prominent organizations is the University of Wisconsin Solar Laboratory, founded over 20 years ago and based in Madison, one of the few nationally recognized organizations currently involved in fundamental solar energy research. Graduates of its program staff many of the agencies involved in solar research including DOE and SERI. The School of Architecture and Urban Planning recently added Prof. Michael Utzinger, a graduate of the Solar Lab, to strengthen its faculty in this area. Prof. Utzinger, who holds the M.S. Engineering degree in addition to architectural credentials offers our energy fundamentals course and will be delivering a number of short continuing education courses for professionals through UWM Extension. The Department plans future expansion of energy design programs both within the School and for the professional community.

In this regard UWM's School of Architecture and Urban Planning sponsored together with the National Endowment for the Arts and Department of Energy a major energy conference on April 23 to April 25 inclusive. Nationally recognized speakers offered workshops including: Ralph Knowles, Ph.D.; Amos Rapoport, Distinguished Professor, UWM; Richard G. Stein, longtime energy advocate; and Will M. C. Lam, Professor at Harvard and M.I.T.

It is extremely encouraging to see, in addition to an increase in thermal education, a rising concern by Wisconsin Congressmen for incentive legislation encouraging conservation in building design. On February 2, the SOLPLAN Conference was held in Madison to present and discuss the research and recommendations of a DOE funded study directed to energy conservation in the individual residential sector within Wisconsin. The Conference attracted an unusually large number of well-informed State legislators as well as educators, energy researchers and government officials.

Of particular interest to the architectural community are a number of policy recommendations:

1. Weatherization Standards/

The State Legislature is asked to develop mandatory weatherization standards in conjunction with DILHR. Possibly these might extend to passive retrofitting of existing housing stock. Policy recommendations include substantial tax credits and possible outright grants for low income families, whose homes account for a disproportionately large share of energy loss in the housing sector.

Professional Leadership will be required in helping to define and promulgate new residential and commercial thermal efficiency standards.

2. Energy Clearinghouse/

The SOLPLAN report calls for the formation of an "energy clearinghouse" in Madison to provide a centralized agency where the public as well as design professionals might obtain current information on thermally efficient methods and materials.

3. Passive Vs. Active/

Although SOLPLAN includes some recommendations for continued research development of active collector sys-

tem for cost beneficial active systems. On the other hand, passive design proposals appear to be extremely economically attractive and with legislative incentives, irresistible.

4. Wood Burning Heat

Generators/

SOLPLAN includes recommendations for development of innovative woodburning equipment and residential designs to take advantage of Wisconsin's renewable fuel resources. This represents one of the most controversial parts of the report, raising questions about ecological and environmental impact. However, the case of utilization of alternative energy sources in Wisconsin is an urgent one. Currently we import 98% of our fuel requirements creating an immense flow of both jobs and dollars from the State. An estimated 9 billion dollars is expected to leave Wisconsin over the next five years. SOLPLAN proposals could, if implemented, retain 30% or more of this expenditure within Wisconsin.

tems, the main thrust of the report emphasizes the substantial cost-benefits related to passive design measures for new and existing housing. Experiments undertaken at the Energy in Buildings Research Institute corroborate this point of view. Our climate does not, for the foreseeable future, provide a viable setting for Wisconsin's economy, providing new jobs and immense opportunities for architects and other design professionals.

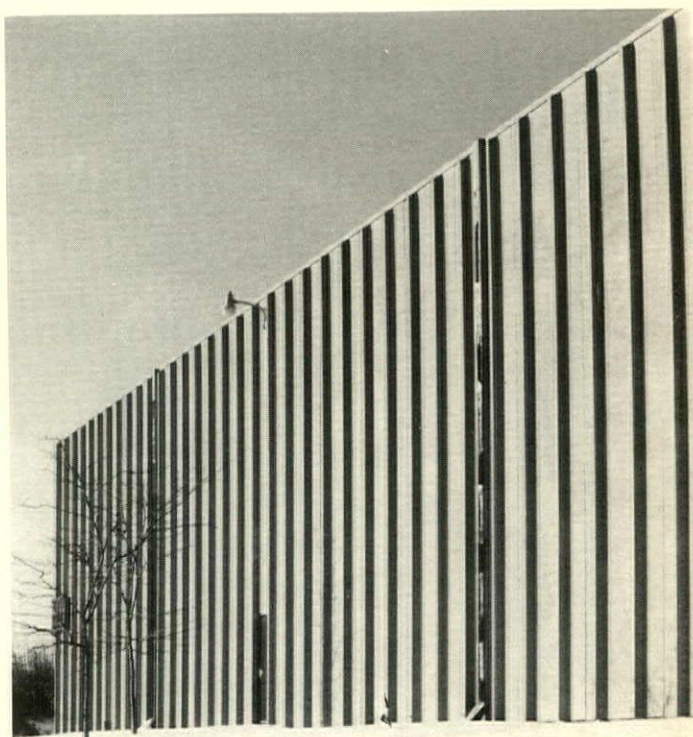
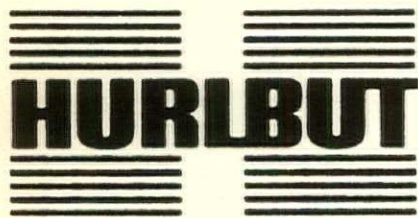
Wisconsin Architects are fortunate in being in an enlightened Legislative environment with respect to thermal efficiency of buildings. In one respect our harsh winter climate may prove to be advantageous to our profession by generating a substantial number of new commissions and providing increased opportunities for retrofitting existing buildings.

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Alternate Income Report

by Noble E. Rose, AIA

During 1980, the WSA Officers, acting as the long range planning arm of the WSA, opted to look into alternate income options for the WSA.

Although WSA dependency on income from membership fees is enviably low among AIA components, it was thought that if additional income could be generated more services and benefits could be made available to the members and fees could be held in line as the economy escalates.

Ideas that surfaced through the efforts of the Long Range Planning Committee, the Executive Director and the past Presidents are listed in this article. To obtain a good cross section of the membership, additional ideas are being solicited. We are asking that you look over this list, brainstorm some ideas and offer suggestions.

ALTERNATE INCOME/GROUP I: These ideas relate to the fact that alternate services might be made available to members or individual firms, primarily on a one to one basis, that would be supported by a fee from the subscriber. These services should be extra ordinary in nature and not be of a general type of service which the WSA should be expected to offer to all. Examples within this category:

Referral Legal Services — Preliminary consultation or a "checkup", limited to business matters as they relate to design professionals.

Building Commission Minutes — The agenda and minutes would be provided to a subscriber list.

Group Life Insurance Plan — A Term Plan arranged by WSA to replace the AIA Plan that is not available in Wisconsin due to Insurance Commission Regulations.

MASTER SPEC 2 — Provide word processing service to subscribing firms.

Financial Management Computer Processing Service — Involving automated accounting systems, payroll, project control, etc.

Office Management, Marketing, etc. Consultation Coop — With cost divided between two to four firms, a specialist (Welde Cox, for example) could be brought to Madison or Milwaukee for a day or two.

ALTERNATE INCOME/GROUP II: It is possible that some of WSA's present income sources could be reviewed for modifications that would lead to greater income. Some examples might be:

Initiate Firm Membership Category — The 1979-80 Financial Task Force investigated methods to arrive at equitable dues. A plan was developed which would reduce the individual membership dues and shift the burden more equitably to the firms. Inherently, increased income remains a potential if this plan were instigated.

Convention Income — By offering a larger exhibit floor, as is the case in Milwaukee, income will be increased.

Expanded Document Sales — Other bookstore type merchandise could be put on display within the WSA Offices and promoted for sale through catalog type mailings. An additional market might be realized during holidays for gift purchases, client appreciation gifts, etc.

ALTERNATE INCOME/GROUP III: Finally, there may be opportunities available for new sources of income, not related to either Group I or II. Some suggestions offered were:

Investment & Real Estate — This was reviewed several years ago and an opportunity for the purchase of a FLLW Building in Madison surfaced as recently as 1980. It was suggested that space could be rented or leased to WSA as well as related professionals or their associations.

Grants — WSA has looked into funding from the Wisconsin Arts Board, The Wisconsin Humanities Board and recently prepared a proposal for MASEC.

Sample Room — Space for display of manufacturer's products. A central place where Architects bring their clients to review the latest products and materials.

Art Works Sales — Silent auctions on member's art work, mounted architectural drawings, etc.

Standards Library — (Possibly a Group I Item for subscription if start up costs are too high.) — Make available for immediate need of seldom used standard or references to ANSI, Fed Spec, Mil Spec, ASTM, Commercial Standards, Trade Association Standards, out of state codes, etc.

"Guide to Architecture in Wisconsin" — Publish such a guide comprised of individual sections from each community. The individual sections could be made available for purchase by local Associations of Commerce, Welcome Stations, industries, etc.

This request for additional ideas is an experiment in involvement. At the present time, no group has sat under one roof to legitimately categorize this effort as an alternate income task force. Hopefully, membership input will make this the largest task force in the history of the WSA. Your ideas are requested. Send them in today!

ENERGY CONSERVATION

Insulated Precast Concrete Wall Panels may be the solution to today's stricter building code requirements for Energy Conservation.

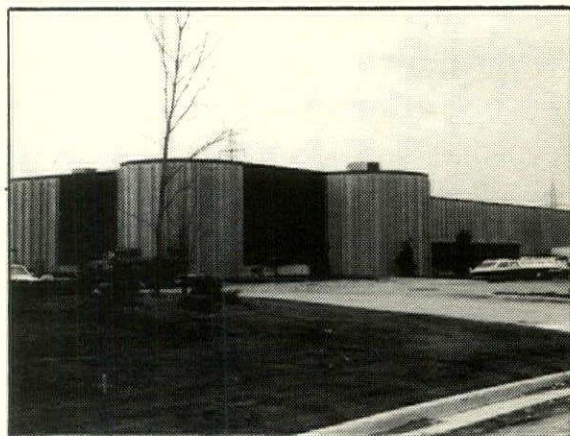
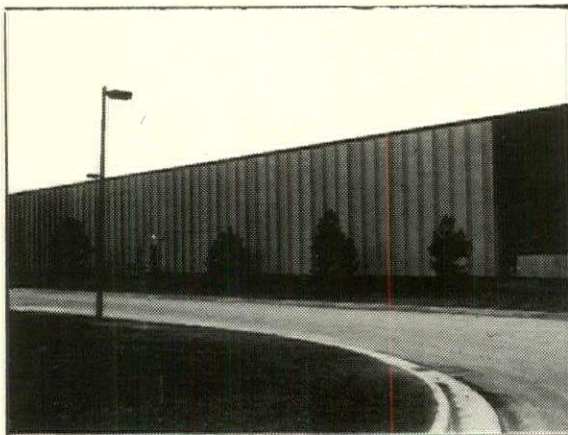
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can result in "U" values of .19, .10 or whatever your requirements may dictate. We offer a variety of exterior finishes from form finish to exposed aggregate. All this in either a load-bearing or non load-bearing Wall System! Pictured here is a sample of our "Energy Efficient" Wall Panels:

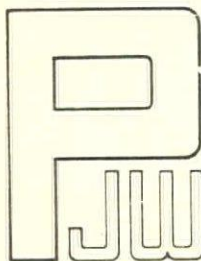
Owner: Trammel Crow Company; Milwaukee, Wisconsin

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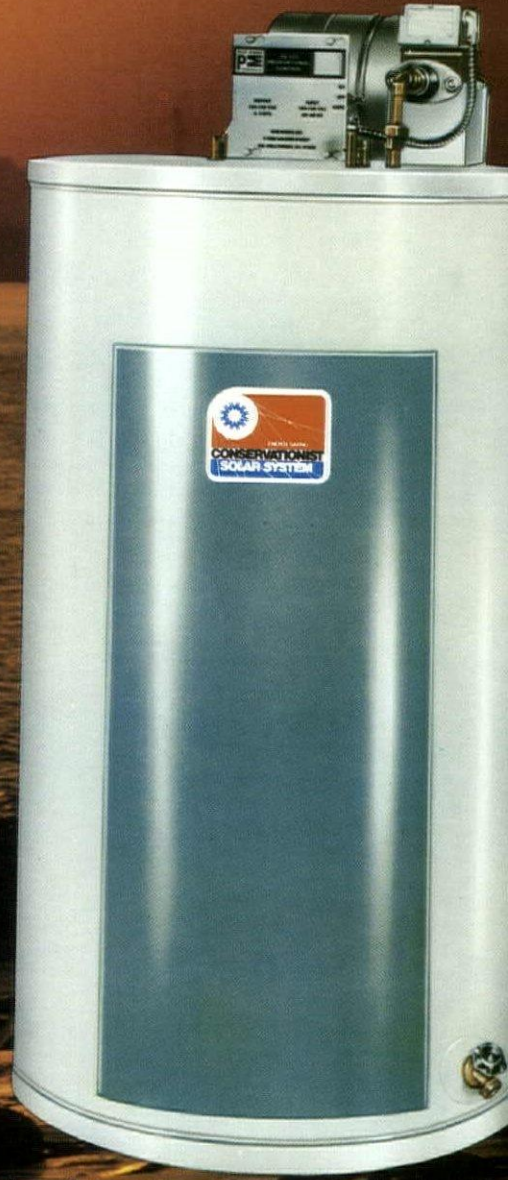
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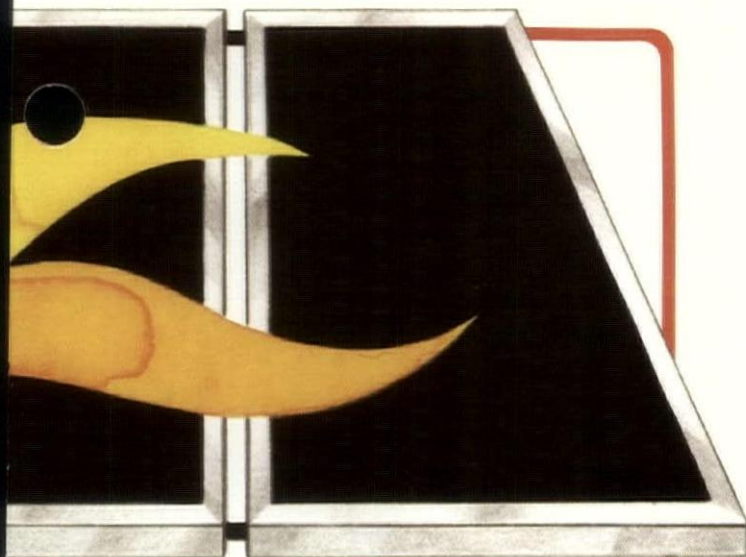
The CONSERVATIONIST solar system can be tailored to any area and prevailing weather conditions. The CONSERVATIONIST solar system is also designed for use with existing water heaters.

CONSERVATIONIST[™] SOLAR SYSTEM—CSS MODELS (with NSC-186 Panels)

SIZING GUIDE

MAJOR COMPONENTS IN CSS SYSTEM

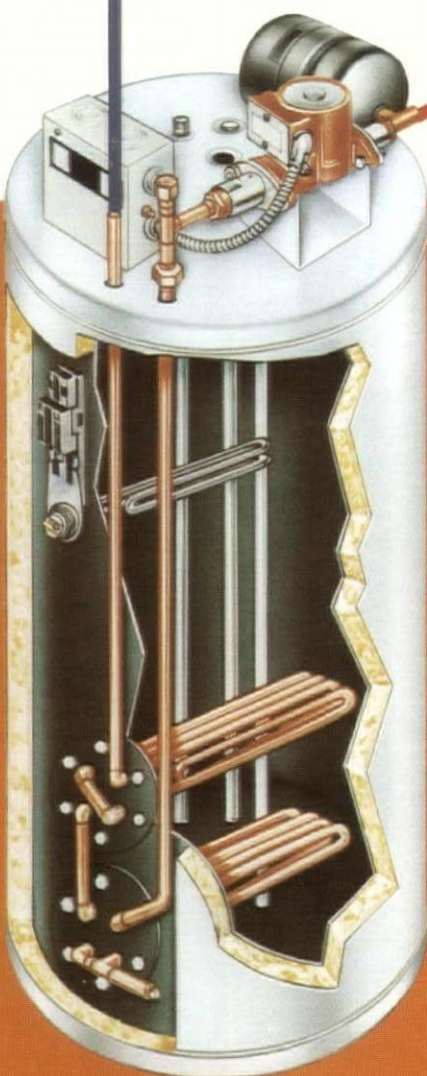
SOLAR SYSTEM	WATER HEATER	NUMBER OF COLLECTORS
		MODEL NUMBER



CLOSED-LOOP SYSTEM

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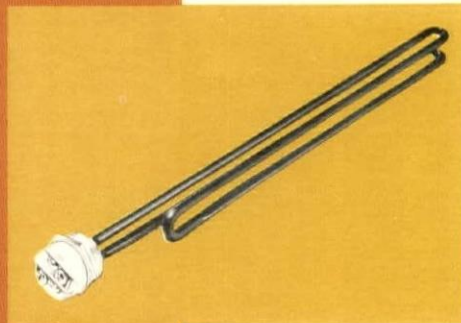


MODEL
SUN-82



here's how the CONSERVATIONIST solar system works:

- The hot sun rays are absorbed by roof-mounted collector panels to heat special anti-freeze fluid that is circulating through integral copper channels.
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- Diaphragm expansion tank is provided on top of heater to handle expansion of heat transfer fluid in closed-loop circulating line.
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CONSERVATIONIST SOLAR SYSTEMS

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WISCONSIN ARCHITECTS FOUNDATION

THANK YOU

The Wisconsin Architects Foundation (WAF) is involved in a fund raising drive in an attempt to increase their endowment. In less than 12 months those efforts have raised over \$9000.

The WAF thanks the following individuals and companies for their contributions. The WAF is continuing to seek additional donations (tax deductible). For more information contact any WAF Director or the WSA office.

Don Schraufnagel
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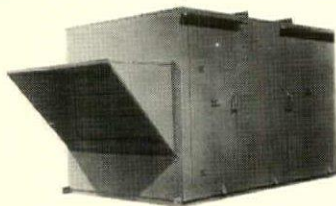
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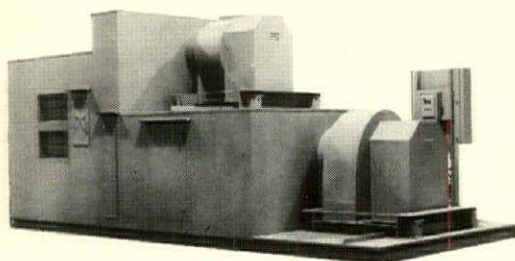
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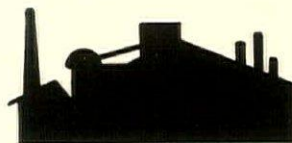
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SOCIETY NEWS

CONGRATULATIONS WAF!

Congratulations are in order to the Board of Directors of the Wisconsin Architects Foundation for their diligent fund raising efforts during the last year.

During the past 12 months, the WAF has generated in excess of \$13,000 in income. For fiscal year 1981-82 the Board of Directors of the Wisconsin Architects Foundation has increased their expenses for scholarship and donation to \$8,000 projecting incomes to equal those expenses plus providing additional funds to increase the endowment of the WAF.

The officers of the WAF for 1981-82 are Harry Schroeder, AIA, LaCrosse . . . President; Len Reinke, FAIA, Oshkosh . . . Vice President; Richard Griffith, AIA, Milwaukee . . . Secretary/Treasurer. Other members of the WAF are: Paul Bronson, Milwaukee; Dick Knothe, AIA, Middleton; Mark Pfaller, FAIA, Milwaukee; Florian Remitz, AIA, Madison; Doug Smith, AIA, Chippewa Falls; and John Somerville, AIA, Green Bay.

The Board of Directors of the WAF express their appreciation and thanks to all who have contributed to its growth during the past year and looks forward to increased scholarship activity during fiscal year 1981-82.

PROMOTING THE PROFESSION

The Milwaukee Journal is interested in featuring "significant" projects on a monthly basis. The WSA is providing assistance in identifying these projects by circulating an information sheet to all of its members which will provide The Milwaukee Journal the preliminary information for screening projects for these articles.

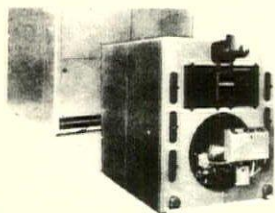
The WSA feels that this proposed series of articles provides an excellent opportunity to promote architectural awareness and appreciation throughout Wisconsin. Promote architecture by completing this form and returning it to the WSA office. If you have misplaced the form, call Eric or Karen at the WSA office.

HELP WANTED

The Wisconsin Architect Editorial Board has regretfully accepted the resignation of Betty Mead who is relocating to California. The Editorial Board is seeking a new member to participate in once a month meetings held in Milwaukee. For more information contact Eric at the WSA office or any member of the Editorial Board.



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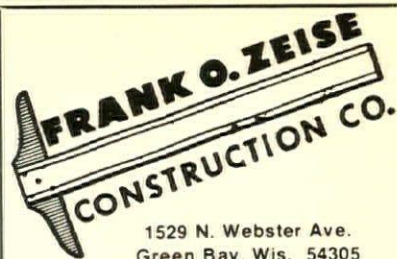
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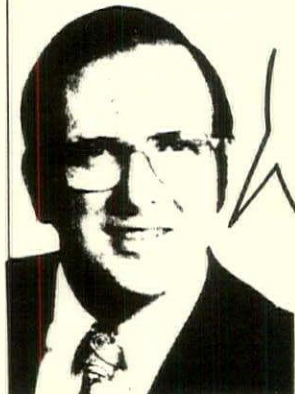
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A
POEM

The outlook wasn't sunny for the exhibitor/architect golf outing that day.
The sky was dark and cloudy with 18 holes of golf to play.
But 100 optimistic golfers turned out to play that game,
With visions of achieving blind bogeys, low gross, and other related fame.

A struggling few headed for the bar when the first raindrops began to fall,
But most of the architects and exhibitors went out to strike the ball.
They thought if only they could, but get out on the course to play,
They'd put up even money that they'd make a hole-in-one that day.

So out charged Kassens and Gennerman, followed by Gray and West
All seeking that magical hole in one . . . to prove they were the best.
Their slices, hooks, and wiffs brought melancholy and despair,
In fact it has been reported that some curses filled the air.

Pfaller, Halloran, Herbst and Earll were all playing about the same,
All like a bunch of sophomores, who were still mastering a difficult game.

So upon that stricken multitude grim melancholy contradicted the fun,
For there seemed but little chance for a scoring of a hole-in-one.
But supplementing this beer drinking mass, Quin, Shutter, Olson and
Lawson did appear
Striking their mighty drivers and drinking their ration of beer.

And there on one par three hole where to the wonderment of them all,
With Shutter's cigar a billowing, Lawson drove the cover off the ball.
And when the dust had lifted and this foursome looked toward the green,
They saw what none of the assembled masses had that day previously seen.

Yes, you guessed the predictable ending of this happy tale I tell,
Lawson's ball had struck the green and fallen into that flagstick well.

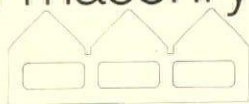
The moral of this story? I'm not sure there's one at all.
Support the WSA and you'll have yourself a ball.

by anonymous



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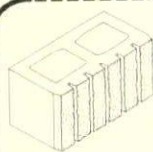
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The architectural firm of Potter, Lawson and Pawlowski, Inc., have moved to new offices at 15 Ellis Potter Court, Madison, WI 53711.

**MEMBERSHIP
ACTIONS**

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STEVE HARMS, was approved for AIA Membership in the Southwest Chapter.

DAVID HUELSBECK, was approved for Associate Membership in the Northeast Chapter.

STEVE LANDE, was approved for Student Membership in the Southwest Chapter.

DAN W. LEE, was approved for Associate Membership in the Southwest Chapter.

MICHAEL K. NATE, was approved for Student Membership in the Southwest Chapter.

MARY PETERSON, was approved for Student Membership in the Southwest Chapter.

JOSEPH POWELKA, was approved for AIA Membership in the Southwest Chapter.

TIMOTHY E. SEIDEL, was approved for Associate Membership in the Southeast Chapter.

STEVEN SHERVEY, was approved for Associate Membership in the Northwest Chapter.

ROBERT M. SIMBACH, was approved for Associate Membership in the Southeast Chapter.

ELMER J. TRANTOW, was approved for AIA Membership in the Southeast Chapter.

BRAD WALDMANN, was approved for Student Membership in the Southwest Chapter.

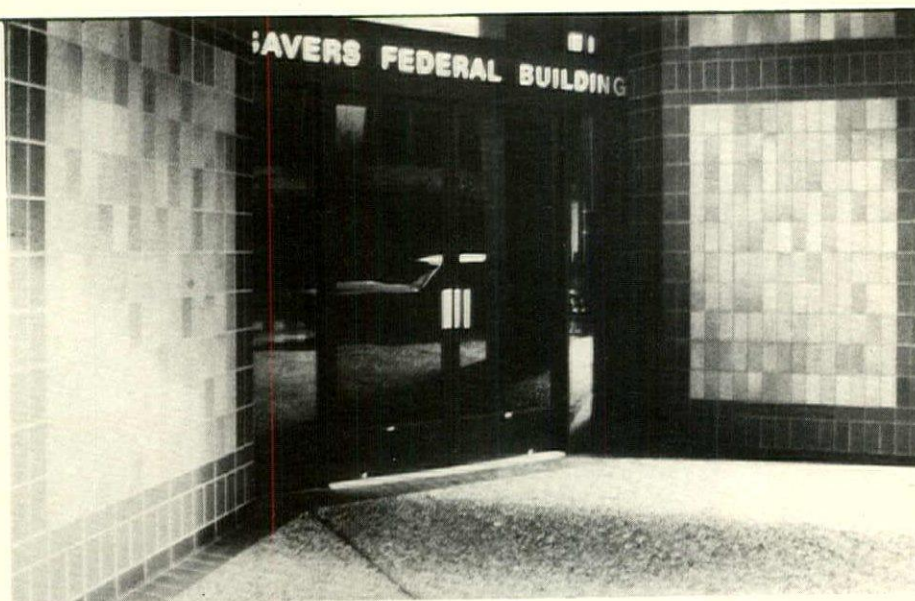
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**DESIGN
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A common problem in using the AIA agreements occurs when the parties attempt to adapt the form document to a situation or set of relationships other than the one for which it was designed.

For instance, it apparently is not uncommon for an architect to be retained by an owner only for services during the design phase, with the architect having little or no involvement with a project during construction. In this situation, the parties may attempt to utilize AIA Document B141 by deleting all services listed under the construction phase (Paragraph 1.5). Even though the architect is not to be involved during construction, Subparagraph 1.5.5 probably should be retained because it disclaims any responsibility on the part of the architect for the performance and liabilities of the contractor and subcontractors.

In addition, provisions should be added to specifically stipulate that the architect is not performing construction phase services. This disclaimer will help avoid an allegation that this obligation was an implied duty.

If the architect is not going to be performing construction phase services, contract provisions should be developed to give the architect some rights to protect himself in case changes are made during construction which deviate from the documents submitted by the architect for permit purposes. Under these circumstances the architect will not be in a good position to prevent the contractor from making changes that may be contrary to design intent, applicable codes, or that may result in a defective project. After the fact, it may be very difficult to determine if a problem is caused by a deficiency in the design or by changes made during construction, with liability potentially being imposed on the architect for whatever problems arise.

**ARCHITECTS
WHO
ARE
CONSTRUCTION
MANAGERS
(OR
VICE
VERSA)**

Ever find yourself in the position of providing both architectural and construction management services ??? One of the preliminary issues that faces an individual involved in this situation is the type of agreement to utilize in contracting with the owner.

Recent investigation indicates that an individual involved in this type of relationship with his client has three options:

1. Use **both** the AIA for B141/CM and B801, going through both forms and deleting all references which indicate that the Architect and the Construction Manager are different individuals or entities.
2. Draft a hybrid contract using the AIA form B141/CM and B801 as guides.
3. The National Society of Professional Engineers publishes a form 1910 - 15 "Standard Form of Agreement between Owner and Project Manager for Professional Services." A few architects have reported modifying this form to be used when the architect is providing both architectural and construction management services.

The above list is not suggested as being definitive or even correct. If you've got a better idea or feel that these suggestions are incorrect please let us know. The expanding scope of architectural services and the means by which these professional services are provided to clients all require innovations and flexibilities in the documents defining the nature of these services. The WSA attempts to keep updated in this area, and is interested in your input, thoughts, suggestions and comments.

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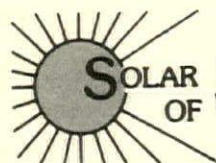
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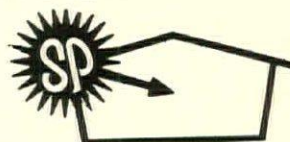
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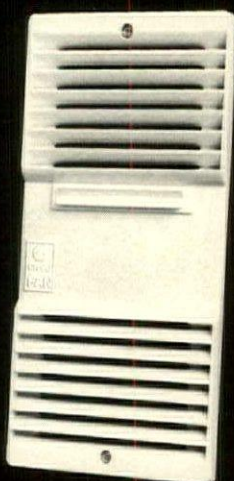


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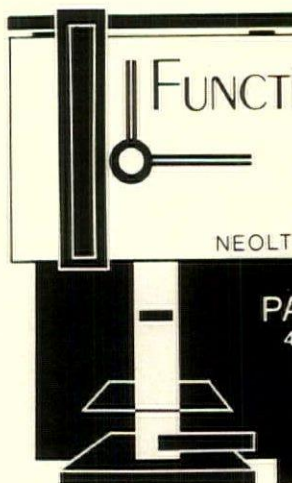
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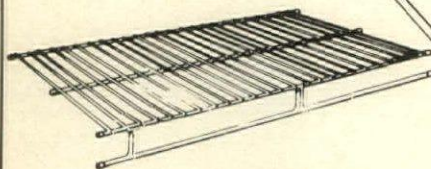
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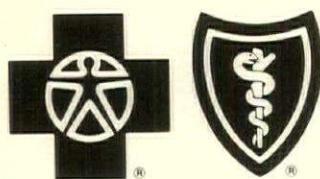
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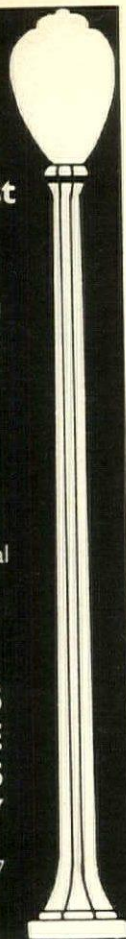
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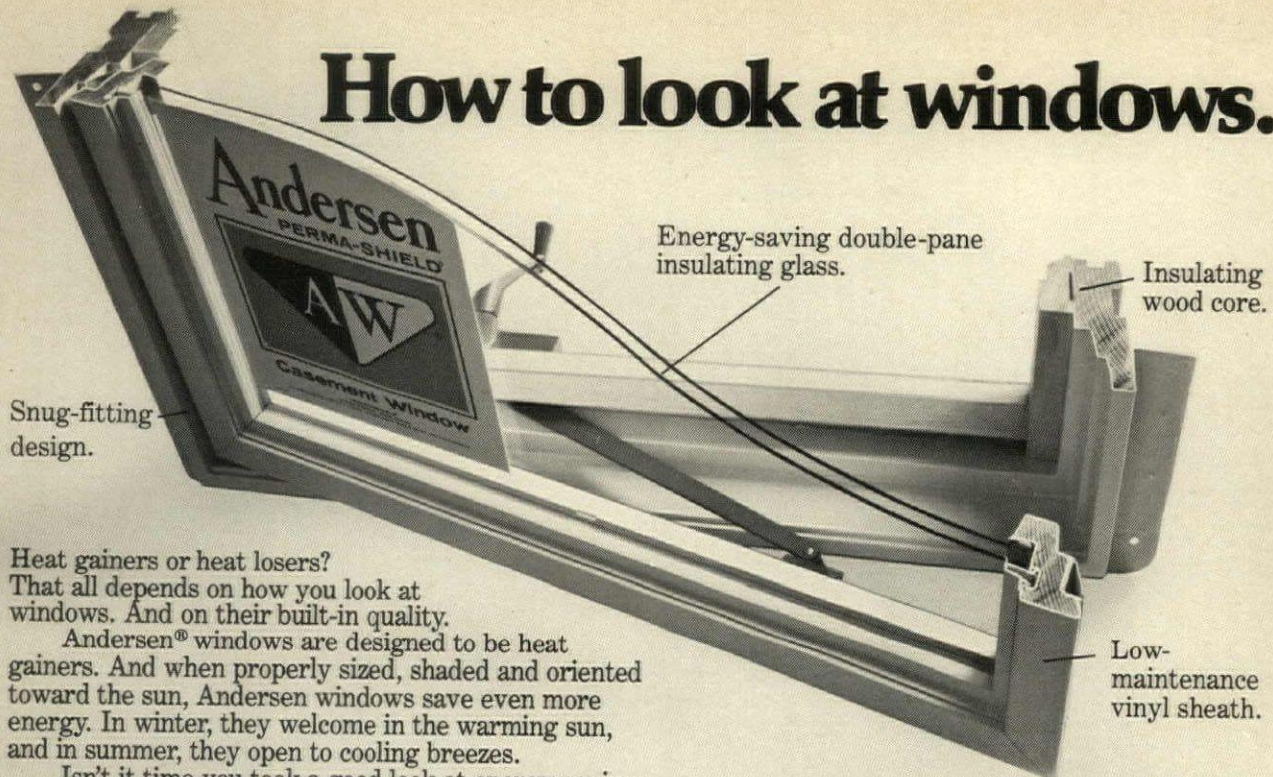
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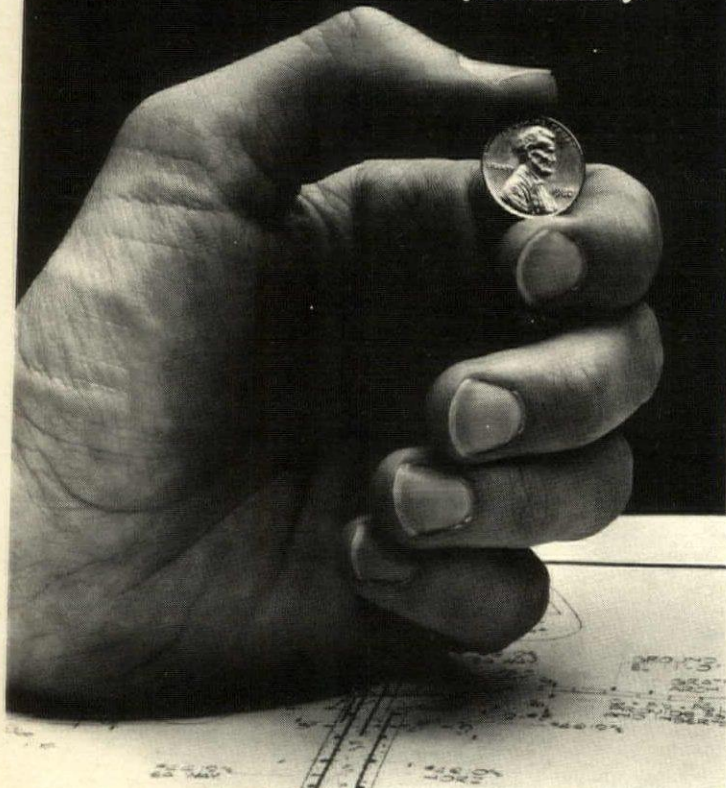
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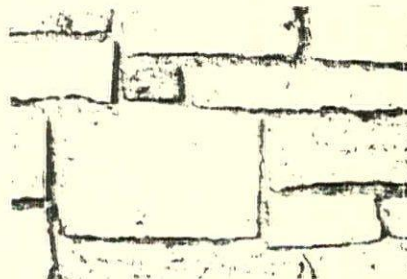
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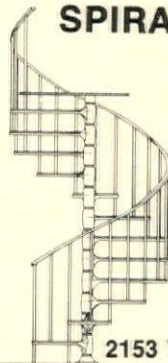
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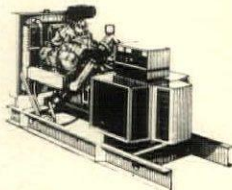
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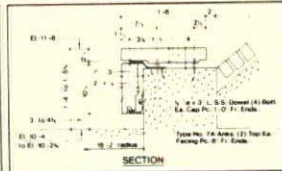
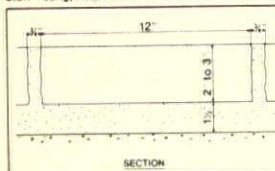
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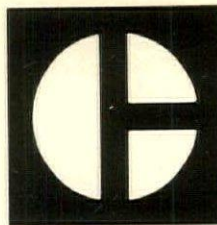
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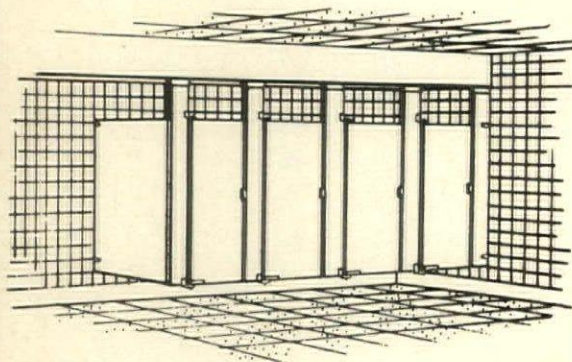
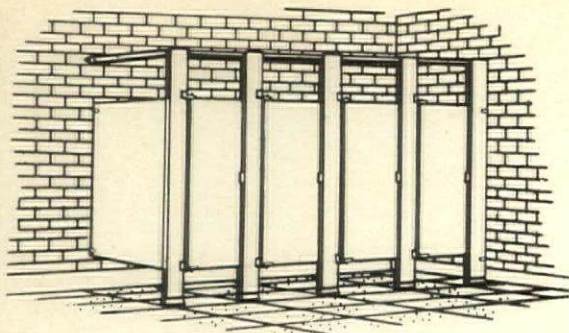
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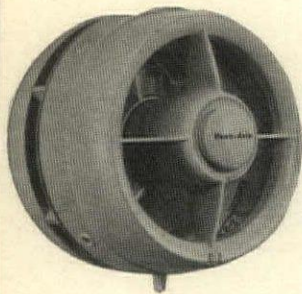
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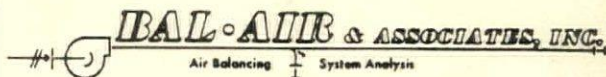
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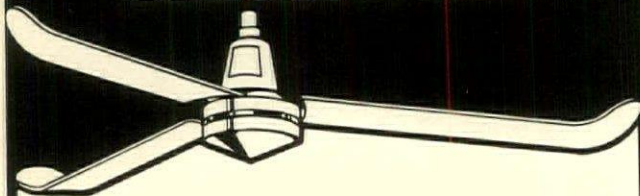
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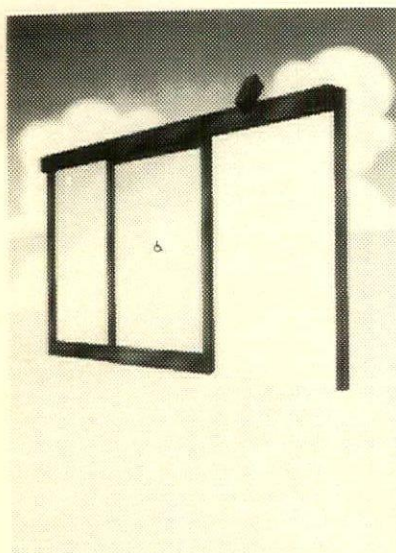
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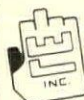


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